

Applicant: George P. Emerson
For: IMPROVED INSUFFLATION-EXSUFFLATION SYSTEM WITH
PERCUSSIVE ASSIST FOR REMOVAL OF BRONCHO-
PULMONARY SECRETIONS

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1 1. An improved insufflation-exsufflation system with percussive assist
2 for removal of broncho-pulmonary secretions comprising:

3 a conduit for connection to a patient's airway;

4 a pressure source for providing to said conduit alternating positive and
5 negative pressure fluctuations at a first rate corresponding to patient insufflation and
6 exsufflation; and

7 a control mechanism for varying pressure during positive and negative pressure
8 fluctuations at a second higher rate to periodically decrease the positive pressure during
9 positive fluctuations and decrease the negative pressure during negative fluctuations to
10 provide percussive pulses during at least one of insufflation and exsufflation to clear
11 broncho-pulmonary secretions from the patient's airway.

1 2. The improved insufflation-exsufflation system of claim 1 in which said
2 control mechanism includes a valve device.

1 3. The improved insufflation-exsufflation system of claim 2 in which said
2 valve device vents the positive and negative pressure provided by said pressure source to
3 generate the positive and negative pressure pulses.

1 4. The improved insufflation-exsufflation system of claim 1 further includes
2 a flow control device for setting the level of pressure decreases during said pulses.

1 5. The improved insufflation-exsufflation system of claim 4 in which said
2 flow control device includes a restriction mechanism.

1 6. The improved insufflation-exsufflation system of claim 1 further including
2 a drive device for controlling the frequency of said second rate.

1 7. The improved insufflation-exsufflation system of claim 6 in which said
2 drive device includes a motor and a motor drive circuit.

1 8. The improved insufflation-exsufflation system of claim 2 in which said
2 valve has an open position for generating said pressure pulses and a closed position.

1 9. The improved insufflation-exsufflation system of claim 2 in which said
1 valve has a partially closed position for reducing the overall pressure of the pressure
2 fluctuations produced by said pressure source in said conduit and an open position for
3 generating said pressure pulses.

1 10. The improved insufflation-exsufflation system of claim 9 further includes
2 a drive circuit for controlling at least one of the frequency and stroke of said valve.